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ABSTRACT

This document, prepared as a conference handout, consists of a description of the revised General Educational Development (GED) Tests scheduled for introduction in 1988 and a series of recommendations concerning the content of future GED tests, which were formulated by a committee appointed by the Commission on Educational Credit and Credentials to review GED testing. The committee's recommendations for the GED Tests include the following: greater focus on high-level thinking and problem-solving skills, a clear emphasis on the relationship of skills to aspects of the world of work, questions that reflect an awareness of the role and impact of computer technology, test items that address certain consumer skills, and the use of settings on the test that adult examinees would recognize. The next section of the handout includes discussions of the content, levels, and format of the writing, social studies, science, literature, and mathematics tests. Overall details of the test battery are outlined. Concluding the guide are a list of GED Test Specifications Committee members and a series of reference lists dealing with GED testing and individual subject areas covered on the tests. Sample items from the individual tests in the battery and a list of formulas are appended. (MN)

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ED249367

The General Educational Development Testing Service

OF THE AMERICAN COUNCIL ON EDUCATION ONE DUPONT CIRCLE WASHINGTON, D.C. 20036

202-833-4580

HANDOUT FOR THE SESSION:

WHAT SHOULD THE GED TESTS MEASURE?:
SOME PROPOSED CHANGES

National Adult Education Conference
November 9, 1984

To the Reader:

The attached description of the revised GED Tests scheduled for introduction in 1988 is a working draft rather than a final description. The information contained in the paper is accurate as of this date, but is subject to modification. Because many of the proposed changes involve new question formats and different cognitive emphases, it is not yet possible to finalize all of the details (e.g., number of questions in each test, time limits, etc.) for the new test batteries. As we complete our field studies next year and work with item writers, editors, and publishers of adult education materials, we will refine, expand, and disseminate improved versions of this description.

Recently, the American Council on Education Commission on Educational Credit and Credentials approved the attached description to serve as the general model for the new tests. The Commission, however, deferred the final decisions on the inclusion of a writing sample as the second part of test one and on the use of calculators by examinees until feasibility studies have been completed and evaluated. We anticipate that final decisions will be made on these two proposed changes next fall.

We plan to issue periodic updates and revised descriptions during the next three years as additional details are settled. For these reasons, this description should be understood to be a preliminary version subject to some revisions during the next year or so. This description should not, therefore, be cited or quoted as describing the actual tests to be introduced in 1988.

We appreciate your interest and your cooperation.

GED Testing Service Staff

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The General Educational Development Testing Service

OF THE AMERICAN COUNCIL ON EDUCATION ONE DUPONT CIRCLE WASHINGTON, D.C. 20036

202-833-4580

M E M O R A N D U M

TO: Commission on Educational Credit and Credentials

FROM: GEDTS Staff

DATE: September 1984

SUBJECT: Description of the New GED Tests (third draft)

During February 1984, the GED Tests Specifications Committee met to begin to develop recommendations for the tests to be used in 1988 and beyond. (Committee members are listed on page 25 of this memorandum.) Their charge was to offer recommendations for revising the tests, based on the goals of the GED testing program, the nature of its examinees, the recent analyses of changes and recommendations for change in American education, and their extensive experience in secondary and adult education. (A list of the major published reports and references used by the committee panels is included on pages 27-29 of this memorandum.) The committee has now completed its report which includes many recommended changes for the tests (GEDTS, 1984).

THIS MEMO DESCRIBES THE NEW GED TESTS AS THEY WOULD BE DEVELOPED BASED ON THE RECOMMENDATIONS OF THE TEST COMMITTEE. In preparing these descriptions, the staff also considered the survey results and discussions associated with Phases 1-3 of the five-year review (see Spille, 1984a & 1984b) and our experience in developing the current tests. Efforts were made to incorporate the intent of the test committee in all areas. (Places where the staff judges that the panels' recommendations are inconsistent and/or not workable are noted.) In some places, where the committee recommendations did not contain explicit recommendations (e.g., for the relative emphases to be placed on various content and skill domains), the staff has inserted the needed information so as to be generally consistent with the committee's intentions.

This paper is intended to assist you in understanding the ways in which the tests would be constructed if the committee's recommendations are followed. The paper incorporates language intended to effectively communicate the nature of the new tests to teachers, examinees, and others. The test descriptions are, for now, only tentative; they are for discussion purposes only and will no doubt be modified in subsequent drafts. For these reasons, please do not cite or quote this memorandum.

OVERVIEW OF THE COMMITTEE RECOMMENDATIONS

The main recommendation in the panel reports is that **the new tests should demand more of the examinees in the way of high level thinking and problem solving skills.** While reaffirming that the GED Tests should continue to concentrate on the skills expected as outcomes of a four-year program of high school study (as did the survey responses in Phase one), the committee stressed that these be viewed as a set of **comprehensive, integrated skills** rather than isolated fragments of learning from individual disciplinary areas. Viewed in this way, the major and lasting outcomes associated with the completion of a high school program of study are those reasoning skills that enable a person to understand, explain, and evaluate new experiences.

This recommendation parallels the concerns now paramount in the National Assessment of Educational Progress (LaPointe, 1984). NAEP judges that, with respect to high school students, the basic comprehension skills, math basic operations, and writing mechanics are being addressed through recently introduced assessment and instructional programs. Of concern, however, are the notable declines of achievement levels in inference and problem-solving and analytical abilities. High school students are often unable to support a position with clear and relevant arguments, to infer significance beyond the articulated points in a passage, or to engage in the more complex thought processes of analysis and evaluation. In different words, the test panels showed similar concerns and suggested new ideas for the GED assessment that would expand the depth of the current tests to measure some of these skills. The revised GED Tests would clearly tap more strongly the higher level analytical skills of the examinees.

While test questions requiring high level thinking skills can be written, the staff cautions that such items may be too difficult for high school seniors. While it is hopefully the case that the 1986 or 1987 seniors, on whom the new tests will be standardized, will be more capable in these areas than were their 1977 or 1980 counterparts, this is by no means guaranteed. For that reason, it will be important to schedule an early high school administration of newly developed items to provide the opportunity to analyze this difficulty factor.

A second major theme of the panel recommendations, stressed more strongly in the written reports of some than others, was that **the new tests should include a clear emphasis on the relationship of the skills to aspects of the world of work.** This would be done in two ways: (1) each of the tests could contain items that portray the educational skills as they might be used in a work setting (e.g., a written passage in the Social Studies test might concern an employee faced with a decision about joining a union); (2) each of the tests could include written passages that involve a working person involved in some task (e.g., a math item might involve an employee trying to describe in words the information contained in a graph). In these ways, the tests would reflect the connection between educational skills and work tasks. Although not specifically referenced as such, many of the objectives to be measured in the tests are represented in the recent "Basic Skills and Competencies for Productive Employment" (Task Force on Education for Economic Growth, 1983). In general, this emphasis would reflect the panels' recommendations that career awareness and work-related use of educational skills be emphasized. Not all items and passages would be so oriented, but some would be.

A third theme of the panel reports was that **awareness of the role and impact of computer technology should be represented in the tests.** It is the way in which computers have affected the lives of the examinees, rather than the specific skills needed to program and operate computers, that is intended here. The panels favored this approach to the role of computers--suggesting that test passages and questions could be developed relating to the impact of computers on the office workplace, their use in supermarket checkout lines, their use in maintaining and retrieving records, their use in analyzing massive amounts of data, and so on. The panels rejected the notion that knowledge of programming languages, hardware operations, or specific program uses be tested. That is, we would not test computer proficiency or computer literacy. (Phase 2 survey respondents gave mixed reactions to the question of whether or not computer literacy should be tested--noting the limited opportunities for adults to work with computers in their educational or personal experiences.) Rather, we would use content that relates to computer awareness in many of the tests and will include the context of organizing the steps necessary to write a simple computer program in test five. (The panels felt strongly, however, that no programming languages should be used. The items would address only the logical ordering of the steps to be taken.)

A fourth theme in the panel reports was that **certain consumer skills should be addressed in the context of many of the tests.** For example, it would be possible to include in the Science tests passages and questions that require the examinee to apply the methods of science in a consumer context (e.g., conducting a simple experiment to determine which laundry detergent produces the brightest wash) and to apply the concepts of science in explaining or interpreting an everyday consumer experience (e.g., to explain why the car radio fades in and out when driving through the area of the city where tall buildings are common). Similarly, in test five, some items could address problems encountered in comparative shopping (ratio and proportion) and installment purchases (percentages and simple interest). Some of the passages in test one can describe situations of concern to the consumer and can convey useful information (for example, considerations in buying firewood as illustrated in Appendix 1) even though they serve as a means to test English conventions skills. In this respect, while the tests would not contain items requiring the examinee to reproduce information needed by consumers (e.g., that manufacturers' warranties must be available for purchased products), the tests would contain examples of the ways in which one can become a better consumer by applying educational skills and knowledge.

A fifth theme common to the panel reports is that **the tests should use settings that adult examinees would recognize.** The panels stressed the need, in all five tests, to present stimulus material that relates to aspects of daily living. Specifically, it was the committee's intent that written material and items used throughout the test battery concern situations recognizable to many examinees. While this has been done with the current tests to some extent, the new tests would involve a greater number of situations recognizable to large segments of the examinee population. Specifically, passages and items on topics including consumer activities, daily living choices, news, sports, entertainment, and the like would form the basis for significant segments of tests 1-5. In this way, concerns about the relevance of the skills tested for the examinees' daily lives will be adequately addressed. While it will not be possible to clearly relate every item to each examinee's experiences, the new tests would measure skills in contexts common to the experiences of many examinees.

TEST 1: WRITING SKILLS

This test would consist of two parts: (1) the first part, subtitled "Conventions of English" would consist of multiple-choice items used to test candidates' ability to recognize and correct errors in and to improve written passages, and (2) the second part, consisting of a writing sample, would require the candidates to compose original responses to a carefully circumscribed task calling for expository writing.

Part One: Conventions of English

Content

Part one of the test would ask examinees to demonstrate their ability to recognize errors in sentence structure, usage, and mechanics as they appear in written passages and to select the appropriate corrections and/or improvements. This part is not a writing test, but rather a test of error correction and editing skills.

In terms of test emphases, this portion of the test would contain errors in sentence structure, usage, capitalization, punctuation, and spelling. That is, the kinds of skills measured here would be those now contained in the first 68 items of the current GED Writing Skills test. The relative emphasis in part one would be: sentence structure errors (e.g., sentence fragments, run-on sentences and comma splices, improper coordination and subordination) 25%; usage errors (subject-verb agreement, verb tense inconsistencies, pronoun reference problems) 25%; major capitalization errors (e.g., dates, addresses, titles) 10%; common punctuation errors (e.g., commas in series, commas between independent clauses, commas after introductory clauses, quotation errors) 20%; common spelling errors (including plurals, homonyms, and possessives) 20%. (Note: named errors will appear in every test form; additional less common or serious errors will be sampled across various test forms.)

Cognitive Levels

The tasks included on the Conventions of English Test measure skills at two cognitive levels, knowledge and application. To the extent that most spelling items involve recognition and recall, those items are classified on the cognitive level of knowledge. The remaining content areas on the Conventions Test involve the application of rules and knowledge in order to identify and correct errors; therefore, they are classified on the cognitive level of application. Only a few items would contain spelling errors that require direct knowledge of the specific word; most items would require the application of the rules of grammar and usage. That is, nearly all the items would require skills beyond simple recall.

Format

The format of the Conventions Test would consist of item sets related to brief written stimulus materials. The passages, about 10-15 sentences in length, would be specially written to comprise a complete piece of discourse concerning some task or situation of obvious interest to at least some segment of the examinee population. The passages would touch upon relevant subjects

with which examinees are likely to be familiar, including, but not limited to, consumer issues, career awareness, and computer awareness. Each sentence would be numbered for reference in the set of associated test items. Each passage would be followed by 5-8 test items. The items would ask the examinee to (1) propose a correction or improvement in one or more sentences (sentence correction formats), (2) propose a reordering or combining of one or more sentences (sentence revision format), or (3) choose the best way to rewrite one or more sentences after he/she is provided with the beginning for the rewritten portion (construction shift format).

Because the English Test Specifications Panel specifically recommended the measurement of editing skills in realistic contexts, in most cases alternatives would range across several content categories. That is, when asked to select the most appropriate version of a sentence, within one item an examinee would be presented with alternatives that may touch upon sentence structure, usage, punctuation, capitalization, and spelling. The item would be classified according to the content area and category of the keyed response. Approximately one half of the items will allow the examinee to select the original version as the most effective. The purpose of this format is to increase the extent to which the test measures both the recognition and correction of error; items that omit the original as an alternative offer examinees a greater opportunity to select a correction by process of elimination. This demonstrates an ability to correct errors but not to locate them.

Also relying upon the larger context of the passage will be a few items for each passage which require the examinee to select the most effective version by considering how well that version matches the point of view, verb tense, and tone of the entire passage. Again, the basis of this format is that even sentence-level errors are rarely corrected in isolation but rather within larger contexts that provide constraints beyond those dictated by the grammar of the sentence alone.

In adopting this model, we abandon the current test format that groups certain kinds of errors (e.g., spelling) and uses word or sentence contexts for the presentation. Rather, all stimulus material appears in complete passage form. This change is in accordance with the panel recommendations that the errors occur in random order within the larger passage context--as they would for a piece of real writing. While the likely improvement in validity that is expected with this shift is attractive, we should note that the new format is expected to be less efficient for testing error detection skills in spelling, capitalization, punctuation, and usage. For this reason, we may need to increase the number of objective items (and time limits) in order to obtain satisfactory reliability characteristics for the new tests.

Appendix 1 contains sample passages and items for part one of the new test.

Part Two: Writing Sample

While granting that the issue of measuring writing with an essay (direct) or through a multiple choice test (indirect) is still very much alive, the English Test Specifications Panel strongly recommended the inclusion of a writing sample in the Writing Skills Test. This recommendation is consistent with the widespread and growing practice of states which require an essay test

for award of the high school diploma. All of the recent national reports on education in America included recommendations that students compose essays and extended pieces of discourse. The English Panel acknowledged the logistical demands of including an essay but noted that large scale assessments are currently being conducted, and that reliable scoring can be accomplished efficiently and economically.

The essay test is distinct from the multiple choice test in Part One because it is a direct measure of writing skills. As such, it measures the chief aim of writing instruction: composition of connected pieces of discourse, not correction of errors. While the predictive validity of multiple choice writing tests has been established in some cases, the GED credential is a certification of skills attained, and the most convincing evidence of this skill is a demonstration of it, not merely a correlate of it. Diederich's (1974) explanation for the widespread use of essay tests is still persuasive:

> As a test of writing ability, no test is as convincing to teachers of English, to teachers in other departments, to prospective employers, and to the public as actual samples of each student's writing, especially if the writing is done under test conditions in which one can be sure that each sample is the student's own unaided work. People who uphold the view that essays are the only valid test of writing ability are fond of using the analogy that, whenever we want to find out whether young people can swim, we have them jump into a pool and swim.

The reports of the Social Studies and Science Panels echoed the English Panel's support for the assessment of writing and for the integration of tasks across the battery. By using topics that address issues in a variety of subjects, the writing sample offers an opportunity to work towards this integration. There is also evidence of the importance of demonstrated writing performance to employers. In a recent nationwide survey, 92% of responding employers rated fluency in English as important or very important, and 58% rated composing letters and reports as important or very important skills (Malizio & Whitney, 1984).

Finally, the English Specifications Panel noted that "a writing sample calls upon students to exercise all skills at once within a specific context, not one skill at a time in unnatural contexts." In this sense, the addition of a writing sample is a further step towards the measurement of skills in realistic settings.

Accordingly, the proposed new tests will contain one writing task--each candidate will be given about 30 minutes to complete his/her essay. (If subsequent analyses make clear that less time is needed, the time allocations will be shifted in order to enable us to add a few more items to part one.) The composition will require candidates to state and support a position, as recommended by the panel. Scoring would be conducted using a 6-point holistic scale that is common to all writing tasks. Because it will be the case that two or more writing tasks will be in use at all times, research to confirm the applicability of a common scale will be needed. It is envisioned, however, that the writing sample could be

readily scored either at the state or regional level by persons working under the supervision of an experienced chief reader. The holistic scores would be converted to a scale with fixed mean and standard deviation and subsequently added or averaged with a derived score from part one to form a standard score on our usual 50/10 scale.

For administrative convenience, and out of respect for the program value that highlights rapid scoring and reporting, the raw scores from part one and from the writing sample would be scaled in such a way that they could be separately reported to the examinee, but subsequently combined on the 50/10 scale. (Much work will be needed to develop sound procedures for doing this and for combining the two scores in a way so that part one and part two carry, respectively, the 45% and 55% weighting that the panel recommends.)

It is anticipated that current GEDTS research on the feasibility of large-scale scoring efforts will yield instructive information about the best means for organizing state or regional scoring services for the writing samples.

Appendix 1 contains sample topics for this part of the test.

TEST 2: SOCIAL STUDIES

Content

Like the current Social Studies test, the content to be measured on the new GED Tests would be drawn from the subject areas of history, geography, economics, political science, and the behavioral sciences (psychology, sociology, and anthropology). The relative emphasis of each of these would remain approximately as it is now (i.e., history-25%, economics-20%, political science-20%, behavioral sciences-20%, and geography-15%). However, the primary emphasis of the test would be on the measurement of integrated, comprehensive skills obtained from an overall study of the social studies rather than on discrete concepts from the various subject areas. This basis for test items is reflected in the language of the statements of objectives; i.e., the objectives are described in terms of the skills and abilities to be acquired in a high school social studies program when one takes a holistic view of the social studies curriculum. Therefore, a given test item might relate to more than one subject area or course. For example, an item dealing with legislation on conserving national forest land might incorporate concepts from political science, economics, and geography.

To illustrate further the notion of integrated skills, it may be helpful to describe the perspective the panel took in viewing the kind of roles individuals play. The panel suggested that the examinee be viewed as an acquirer, user, and communicator of information. From the perspective of the social studies, this acquirer, user, and communicator of information functions as an individual, and as a member of groups ranging in size from the family, to community, to nation, as well as to the global community. In this sense, the skills and knowledge acquired in a social studies curriculum may be thought of as encompassing the full range of an individual's roles in sociological environments. (By including the global community, the panel recommended that the new tests be broader in scope than the current tests; i.e., the tests should not be limited to nationalistic concerns.)

The language used by the test panel in describing this conceptual framework of classifying the skills to be tested may be troublesome to those accustomed to describing outcomes in terms of specific courses. Therefore, the panel's framework will be illustrated by exemplary objectives and items related to the current way of describing the tests. The sample objectives and items in Appendix 2 are intended as exemplary of the level and type of objectives and items that would characterize the new test. It is hoped that teachers will see that while the level and, in some instances, type of expectation has changed, the context in which those skills are learned and tested has not. In comparing the current content and the proposed content, it may be said that the majority (all but the most simple items) of what is tested on current tests would continue to be measured; however, the level of skill at which this content is measured would be increased.

To illustrate the kinds of skills that would be tested using the new specifications, a few sample objectives are presented below. The following list is organized by the current divisions of subject matter, but it is important to remember that some objectives are appropriate for more than one subject area. It should be noted that in the case of history, the subject has been extended to include world history and not just U.S. history; for tests developed for use in Canada, the emphasis would be on Canadian history rather than U.S. history.

Area	Sample Objective
History	Demonstrates an understanding of historical influences on the development of governmental systems.
	Demonstrates an understanding of the patterns of urban and rural development over time.
Economics	Understands the role of competition in a free-market economy
	Understands the effect of economic decisions on the achievement of economic goals (e.g., what to produce, how to produce, and for what market to produce)
	Understands the relationships between the basic economic resources of natural, human, and economic resources
Political Science	Understands possible worldwide effects of decisions made by individuals, communities, and nations (e.g., effects of domestic and foreign policy decisions, multinational corporations, economic boycotts, etc.)
	Understands various interpretations of the purposes of government (e.g., preservation of peace; protection of physical safety, personal freedom and property, allocation and preservation of resources)
	Understands the organization and operation of the governments in the United States (Canada if Canadian test)
Behavioral Science:	
Psychology	Is able to examine individual beliefs, values, and behaviors (e.g., identification of beliefs or values and effects on behavior in individuals and groups)
Sociology	Understands the relationships between individuals and groups (e.g., how individuals can impact groups and how groups influence the values of individuals)
Anthropology	Understands the organization of human societies (e.g., into educational, religious, economic groups) and how groups form and function in the context of individuals and societies

Geography	Understands relationships between the location of human activities and the natural environment (e.g., settlement and immigration patterns, location of economic activities)
	Understands the influence of the natural environment on individuals and their culture
	Understands the influence people have on the natural environment

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In defining the content and skill objectives of the new Social Studies test, the panel consulted many references. A few of those which influenced the construction of recommendations are listed in the reference section (p. 28) of this memorandum.

Cognitive Levels

Overall, the level of skills required on the test would be somewhat higher than on the current test. Currently, items are written at the knowledge, comprehension/interpretation, inference, application, and evaluation levels of skill. The percent of emphasis of each of these for the current tests is 10%, 35%, 30%, 20%, and 5% respectively. Items on the new test would require examinees to demonstrate comprehension, application, analysis, and evaluation skills in an overall proportion of 20%, 30%, 30%, and 20% respectively. No items would depend solely on simple recall of facts or isolated concepts/principles. The rationale for increasing the level of skills measured stems from the belief that increasingly the high school social studies curriculum is focused on students' development of relatively higher order skills and understandings which foster individuals' functioning in a complex society.

The cognitive levels of items which would be used are described below.

Comprehension items would require translation, interpretation, and extrapolation of written and graphic stimulus material. Translation requires the ability to accurately restate information presented in other terms which bear a one-to-one correspondence to the original material. Interpretation requires the ability to summarize material by stating the primary meanings or purposes of the original information. Extrapolation requires the ability to identify trends, implications, and consequences not explicitly described in the material.

Application items would require the use of abstractions in concrete situations. The abstractions include such as ideas, rules, or methods. Application items are distinguished from Comprehension/extrapolation items in that the examinees must apply the content given or remembered to a new situation. Abstractions must either be drawn from the information provided or the abstractions must be remembered for use in a new setting.

Analysis items would require breaking down the information into its major parts, and thereby exploring relationships of component ideas. Analysis involves looking for elements, relationships, or organizational principles. Examples of analysis items are those which involve distinguishing facts from hypotheses; determining the consistency of hypotheses with given information and assumptions; and recognizing persuasive techniques in advertising and the like. Items require ability to identify hypotheses, causes, effects, conclusions, and judgments from the material given.

Evaluation items would require quantitative and qualitative judgments of the value of information, methods, or the like for stated purposes. Evaluation items require judging the extent to which information or methods satisfy criteria. The criteria may be provided (or determined by the student from the information presented), or the examinee may be required to use criteria which are assumed known. Examples of evaluation items are those which require assessing the adequacy of data, hypotheses, conclusions, or generalizations in light of a given situation or problem.

Format

The test would consist entirely of multiple-choice items, some of which would be based on written stimulus material (e.g., prose taken from a variety of sources or written by item writers) while others would be based on graphic stimulus material (e.g., graphs, cartoons, tables, charts, diagrams, etc.). In the case of the items based on written stimulus, the passages would be kept short (not to exceed 300 words). About two-thirds of the items on each test would be of the type based on written stimulus material while the other one-third would be based on graphic stimulus material. Some items would be grouped into sets for the sake of sharing common stimulus material (e.g., a set of items based on a short written passages or a set of items based on a graphic stimulus).

All stimulus materials would represent real-life situations encountered by large segments of the examinee population. None would be "text book" situations--contrived to be of only theoretical interest.

One new item format being considered would present a situation as the stimulus for a set of related items and ask the candidate to classify certain elements in the situation as (1) problem, (2) finding, (3) theory, (4) important factor, or (5) irrelevant factor. This set of responses would be used for all items in the related set. This approach is intended to help get at the understanding of key concepts and/or principles. This format would be used for no more than 2 item sets per test form.

TEST 3: SCIENCE

The Science test would continue to measure the expected outcomes of a four-year high school science program. Items would require examinees to apply the methods of science to issues surrounding persistent and important social problems and technological developments. Examinees would be asked to demonstrate an understanding of the implications of science for their own lives and the lives of other people and to deal with the exploring, explaining, and testing of information in new and unfamiliar situations.

Content

Like the current tests, content for half of the Science test would be drawn from the physical sciences (chemistry, earth and space sciences, and physics), and content for the other half from life sciences (biology). Test items would address major conceptual themes--the "universal" concepts which cut across all disciplines of science--as well as their interrelationships . The conceptual themes include: change, conservation of mass/energy, interactions, and time/space. Additionally, the following context considerations would guide the development of test items.

A number of science items would measure an examinee's understanding of how science relates to one's personal life (e.g., how science contributes to the quality of life, well-being, and/or survival of the individual). For example, examinees would be asked to relate current social problems (e.g., energy, population, resource management) to life experiences and to recognize the relative merit of potential solutions that can be derived from applying science methods to these problems. Examinees would be expected to use the methods and concepts of science in everyday decisions regarding individual health and safety. The examinees would also be expected to be able to use information regarding potential hazards of technological developments in evaluating the relative merits of various alternatives in everyday decision-making.

Additional items would measure the examinees' understanding of the natural environment. For example, examinees would be expected to recognize consistency in the principles of and relationships between small and large environments including the interactions of environments and the biological and physical interdependencies within and between environments. Examinees would be asked to identify environmental processes and concepts and transfer these through significant changes in scale, scope, magnitude, or time.

The remaining test items would assess the examinees' understanding of both the potential and limitations of science in explaining natural phenomena. For example, examinees would be expected to be able to view the natural world as intelligible, causal, and not capricious in nature and to be able to recognize the usefulness of applying science skills and methods in dealing with both concrete situations and with the abstract unknown.

Because all panels recognized the importance of preparing students for the world of work, several items on each test form would emphasize relationships between science educational skills and work activities.

Cognitive Levels

Unlike some items on the current test, no items would directly measure the ability to simply recall facts. The Science panel emphasized the importance of measuring abstract reasoning and problem solving ability. Further, items based on written passages would address the understanding and application of relevant concepts. That is, examinees would not be asked to summarize the main idea (whether as a proposed passage title or as a topic sentence), to locate specific facts (e.g., report a fact incorporated in a graph or table), or to speculate about the author's intent or purpose.

The skills required to correctly answer the Science items would reflect the categories comprehension, application, analysis, and evaluation of Bloom's (1956) taxonomy of the cognitive domain. The proportion of items at each of these levels would be comprehension - 20%, application - 30%, analysis - 30%, and evaluation - 20%. In contrast, the current categories and weighting of items on the cognitive domain are: knowledge - 20%, comprehension - 50%, application - 10%, and analysis - 20%.

By increasing the proportions of items at the higher cognitive skill levels, the panel's recommendation to increase the level of skills required has been followed. The panel, however, had described cognitive levels using different terminology: data acquisition, treatment, and transfer. Data acquisition skills include gaining information from written and graphic stimuli as well as choosing appropriate sources and techniques for gathering information. Data treatment skills include interacting with the data that have been acquired and applying multiple perspectives to such data. Examinees would be expected to develop new insights and explanations of phenomena or objects by using these skills. Data transfer skills include making choices based on evaluation of information gained through the acquisition and treatment of data (e.g., deciding which product to buy based on information obtained and considered relative to needs).

The GEDTS staff believes that the four levels of cognitive skills described below (comprehension, application, analysis, and evaluation) incorporate in large measure the intent of the panel's data acquisition, treatment, and transfer levels. The following four categories are seen as a more workable approach for item classification.

Comprehension items would require translation, interpretation, and extrapolation of written and graphic stimulus material. Translation requires the ability to accurately restate information presented in other terms which bear a one-to-one correspondence to the original material. Interpretation requires the ability to summarize material by stating the primary meanings or purposes of the original information. Extrapolation requires the ability to identify trends, implications, and consequences not explicitly described in the material.

Application items would require the use of abstractions in concrete situations. The abstractions include such as ideas, rules, or methods. Application items are distinguished from Comprehension/extrapolation items in that

the examinees must apply the content given or remembered to a new situation. Abstractions must either be drawn from the information provided or the abstractions must be remembered for use in a new setting.

Analysis items would require breaking down the information into its major parts, and thereby exploring relationships of component ideas. Analysis involves looking for elements, relationships, or organizational principals. Examples of analysis items are those which involve distinguishing facts from hypotheses; determining the consistency of hypotheses with given information and assumptions, and recognizing persuasive techniques in advertising and the like. Items require ability to identify hypotheses, causes, effects, conclusions, and judgments from the material given.

Evaluation items would require quantitative and qualitative judgments of the value of information, methods, or the like for stated purposes. Evaluation items require judging the extent to which information or methods satisfy criteria. The criteria may be provided (or determined by the student from the information presented), or the examinee may be required to use criteria which are assumed known. Examples of evaluation items are those which require assessing the adequacy of data, hypotheses, conclusions, or generalizations in light of a given situation or problem.

Format

The Science test would consist entirely of multiple-choice items--as do the current tests--and would contain both stand-alone items and item sets based on written and graphic (e.g., graphs, tables, charts, diagrams) stimuli. Written stimuli would be kept short--less than 300 words. All items would require that examinees interpret the stimulus in demonstrating their ability to understand, to use, or to explain the concepts involved.

One new item format to be considered would present a situation as the stimulus for a set of related items and ask examinees to classify certain elements in the situation into a set of defined categories (e.g., as (1) theory, (2) treatment, (3) finding, (4) important factor, or (5) irrelevant factor). A common set of responses would be used for all items in the set. This approach is intended to measure an examinee's understanding of key concepts. This format would be used for no more than two item sets per test form. Another possible new format (also to be used for only a few items on each test form) would ask examinees to identify the key concept illustrated in the stimulus situation. (For example, which of these situations illustrates the principle of the lever?).

Appendix 3 contains sample items for the Science test.

TEST 4: LITERATURE AND THE ARTS

Content

The English Specifications Panel recommended that the current Reading Skills test be replaced by a test of literature and the arts that would require examinees to read and understand written materials (Literary Selections) representing a variety of genres such as poetry, fiction, journals, letters, drama, and various kinds of prose non-fiction. Examinees would also be required to read passages (Commentary) about music, the fine arts, television, movies, dance, history, and myth. As a principle for the selection of reading materials, the panel urged that consideration be given to the prevalence of various genres in the environment and experience of GED examinees. The panel noted the pervasive nature of literature and the arts in everyday experience and observed that "examinees and those who instruct them need to know this and to honor it in teaching and in learning." The panel further recommended that the passages be connected pieces of discourse--even connected from one passage to another in some cases--ranging in length from 200 words to approximately 750, and that the questions accompanying a passage should tap a range of comprehension skills but should not address an examinee's knowledge of specific literary terms.

The content of the test in Literature and the Arts would consist of materials drawn from two major content areas: Literary Selections (75%) and Commentary (25%). Approximately one third of the materials included among the literary selections would consist of original writings from classical literature, with the remaining two thirds coming from popular literature. For the purposes of the test, literature is considered to include writings of acknowledged quality or writings of contemporary interest or popularity which exhibit particular strengths as models of good writing. Genres to be included in the Literary Selections content area would include fiction, ethnic literature, personal and imaginative writing, poetry, journals and letters, drama, and non-fiction. Materials in the Commentary content area would include prose passages about literature and the arts. Subject matter considered appropriate for all passages in the test would include published comments, reviews, and criticism of music, the fine arts, television, film, dance and literature.

The new test would differ from the current Reading Skills Test in that it would omit the category of practical and general reading selections. This was a conscious omission by the panel and was linked to an observation that other tests in the battery currently touch upon the skills measured in these content areas and that passages in the current test's practical and general reading content areas frequently are not connected pieces of discourse (for example, they include recipes, transportation schedules, and advertisements). The panel suggested that the Social Studies and Science tests were more appropriate contexts for the presentation of the kinds of written information currently included in the practical and general reading sections of the Reading Skills Test.

Cognitive Levels

Reading items based upon materials from literary selections and commentary would measure skills at three cognitive levels: literal (40%), inferential (40%), and evaluative (20%). Literal questions are those with answers that are explicit in the text; inferential questions are those with answers that are not explicit in the text and require inferences on the part of the reader; evaluative questions are those that require an examinee to critically evaluate specified qualities of the text. Both literal and inferential items are divided into those that target specific local meanings and words in the text and those that require global meanings across the entire passage. Within both specific and global literal and inferential categories there are a number of types of meaning that would be assessed, such as main idea, support, sequence, organization, relationships, mood, figurative language, setting, conclusions, and so on.

The following partial list of objectives is provided to illustrate the kinds of skills that would be assessed in the test of Literature and the Arts. Sample test items are provided for many of these objectives in Appendix 4. All items will rely on comprehension of the ideas of a passage at varying levels--from the sentence, to the entire passage, to the structure undergirding the passage--and items would not call upon examinees simply to locate information that is stated in a passage. The classification of items as literal or inferential would depend upon the passage to which they refer. For example, a main idea item would be classified as literal comprehension if the main idea were stated in the passage and as inferential comprehension if the main idea were simply implied in the passage.

SAMPLE OBJECTIVES

Cognitive Classification	Sample Objective
1. Literal Comprehension	
A. Specific	--to comprehend the meaning of a term --to comprehend the purpose of a supporting statement --to comprehend the purpose of a concluding statement
B. Global	--to comprehend the main idea of a passage --to comprehend relationships among elements --to comprehend the relationship of form (e.g., setting, mood) to content
2. Inferential Comprehension	
A. Specific	--to interpret illustrative detail --to interpret figurative language
B. Global	--to generalize from supporting evidence --to predict from supporting evidence --to interpret the meaning of supporting concepts

3. Evaluation	--to comprehend the purpose and effect of stylistic techniques --to evaluate elements of structure (e.g., characterization, organization)

These sample objectives are provided for purposes of illustration and do not represent the full range of objectives to be assessed.

Format

The test format would consist entirely of item sets relating to written stimulus materials. In keeping with the panel's stated aim of presenting test items in realistic and relevant settings, the panel recommended that each passage be preceded with a purpose question. The purpose question is a carefully constructed and very readable question offered as a kind of headline or title to the passage. The examinee as reader first reads the purpose question because it comes first, is typeset in some attention-getting way, and has been noted in the initial instructions as something that should be read before the passage is read. If the purpose question is effective, it provokes enough interest to engage the reader throughout the reading process. In short, the purpose question would provide the reader with a focus to guide the reading process, much as readers are guided in typical reading activities by clear purposes: to identify an argument or position, to be entertained, to gather information, and so on.

Appendix 4 contains sample items for this part of the test.

TEST 5: MATHEMATICS

Like the current tests, this test would present problems in practical, realistic settings. Examinees would be required to translate problems from written contexts to mathematical numerical expressions. The mathematics panel recommends that the emphasis of the test be on problem solving ranging in complexity from simple to complex. Although computation would be required to solve the problems, very few, if any, items would require solely computation. The assessment of problem solving skills would require examinees to decode, select, organize, analyze, and interpret information to solve problems. Some problems would require examinees to recognize that the given data is insufficient to solve the stated problem while others would require examinees to select only what is needed from the information given (i.e., some items would include extraneous information). Also in keeping with the recommendation that the items be realistic, some items would require multiple steps in solving the problem presented.

Content

The content breakdown for the mathematics test would be:

Measurement (30%) - solving problems involving length, height, perimeter, area, volume, mass/weight, and rate (e.g., mph) directly (without using geometric properties) using both metric and imperial systems; reading and interpreting scales and meters

Algebra (30%) - identifying or constructing, setting-up, and solving formulas and equations (most involving one unknown); interpreting and using linear and quadratic relations and equations; applying distributive and associative laws; applying common axioms governing the solution of formulas and equations; using common algebraic symbols (e.g., =, +, $\geq$, $\leq$); understanding and using inequalities

Geometry (20%) - solving problems involving geometric terms such as perpendicular, parallel, diameter, radius, and names of plane and solid figures and their component parts (e.g., diagonal, vertex); identifying rectangular coordinates (points on a graph) and points of intersection; finding the distance between points in a plane; calculating the slope of lines; indirectly measuring angles and line segments using geometric properties (such as Pythagorean theorem, similar geometric shapes, sum of angles in a triangle, properties of right triangles)

Numeration (10%) - solving problems involving: order of operations; number relationships (ordering decimals, fractions, integers, number patterns); rounding; scientific notation; and exponents

Statistics and Probability (10%) - solving problems involving central tendency (mean and median); interpreting and constructing graphs (bar, line, circular) and tables; recognizing the misuse or misinterpretation of statistical information; and finding and using the probability of events in realistic settings

The mathematics panel recommended that a computer awareness section accounting for ten percent of the items be included on the test. Computer awareness was defined as including such numeration and algebra skills as: ordering steps of

a sequence to produce a desired result; identifying results from a logical sequence; identifying from a set of sequences that sequence which produces a desired result. The GEDTS staff feels that computer awareness would be better addressed by making it an integral part of the five content areas listed above rather that making computer awareness a separate content area. The ten percent of items which the panel assigned to computer awareness has been added to the measurement content area. In constructing the mathematics tests, efforts would be made to assure that ten percent of the overall set of items address some aspect of computer awareness. Additionally, in keeping with the panel's recommendations, the role of computers would be addressed by contexts in all five of the GED Tests.

The current mathematics test content area distribution is: Arithmetic (55%), Geometry (20%), and Algebra (25%). By comparing the current mathematics test content area distribution and the proposed distribution presented above, it may be seen that Statistics and Probablility and Numeration are new content areas. The amount of Algebra covered has been increased from 25% to 30%, and, although the percentage for Geometry (20%) has remained the same, the amount of content covered has been increased by virtue of moving some of the concepts previously classified as Geometry (i.e., perimeter, area, volume, and angles) to the Measurement area. Much of the content previously classified as Arithmetic is now contained in the Measurement or Numeration areas.

Cognitive Levels

In keeping with many of the national reports, the panel recommended that the level of skills measured by the new tests be somewhat higher than that measured by the current tests. Primarily, the level of demand would be increased by increasing the extent to which the problems involve multiple step solutions. Because nearly all items would be given in a practical context, they would require translation of the problem from written to numerical expression. Very few, if any, items would be of a strictly computational nature (e.g., ? = (2 + 4) / (18 - 10)). Therefore, examinees would first be required to identify the problem. Once the problem is identified, the examinees would need to determine a strategy or method to solve the problem. The information needed to solve the problem would then be identified and organized, and, finally, mathematical methods applied to arrive at a solution. (That is, most problems would involve at least four steps for solution.) Some of the items would require only that the examinee identify the necessary data or the appropriate method (i.e., the items would focus on only one of the steps in the process). The level of skill required to perform any one of the steps would vary from fairly simple to relatively complex.

In short, the test would focus on a range of problem solving skills. The range of problem solving would encompass the routine and commonplace mathematical demands as well as less frequently applied functions considered to be essential to everyday life. Further, a few items would pose problems at a relatively high level so as to address the more complex skills of problem solving. The sample items in Appendix 5 illustrate the range of problem solving skills that would be required.

Problem solving is described in the report An Agenda for Action: Recommendations for School Mathematics of the 1980's published by the National Council of Teachers of Mathematics (1980) as including mathematical methods which are

applicable in a wide variety of settings. Problem solving involves the traditional concepts and techniques of computation, the use of mathematical symbolism to describe real-world relationships, the abilities to use spatial representations in describing and exploring relationships, and the use of deductive and inductive reasoning to draw conclusions about relationships. Methods employed to solve problems include gathering, organizing, and interpreting information; drawing and testing inferences from data; and communicating results. In keeping with this conceptualization of problem solving, the new mathematics test would contain items which might be characterized as ranging from comprehension, to application, to analysis, to evaluation in terms of Bloom's (1956) cognitive skills taxonomy.

While items on the mathematics test would measure a range of problem solving skills, items would not be classified as measuring a particular level of problem solving. (There appears to be no accepted classification scheme for identifying levels of problem solving. No workable scheme has been found for the current mathematics tests.) Instead, items would be classified relative to the operational skill(s) (set-up, extraneous/insufficient data, and/or solution) and computational skills (addition/subtraction, multiplication, division, or square roots/exponents) addressed. This classification scheme would be tried as an aid in ensuring that each test form would cover a range of component skills used in problem solving.

The panel recommended that items in each of the five content areas described above be written such that approximately 60% of them involve applications of arithmetic and about 40% of the items involve other mathematical applications. The GEDTS staff feels that, if this ratio were stressed in the test descriptions, readers might mistakenly infer that 60% of the test would require only computation. Such an inference would be inconsistent with the panel's overall recommendations regarding the level of demand for the test, so GEDTS proposes that the cognitive level of test items be described only as involving a broad range of problem solving skills.

Format

Although the panel suggested that it could prove useful to include item types different from the current multiple-choice format (e.g., short answer format) in order to better address problem solving, significant obstacles exist in devising a workable plan for allowing fill-in-the-blank formats. However, alternative item types will be investigated for use on subsequent tests. (Computer-administered tests may, at some point, allow for the measurement of more detailed aspects of the examinee's problem solving skills).

With the new tests, a standard approach to the provision of formulas would be adopted. In each mathematics test booklet, a page containing all the commonly used formulas would appear. (Appendix 5 includes a table of the formulas which currently are expected to appear.) Not all of the formulas would necessarily be used in any given test. Providing this lengthy set of formulas is a departure from the panel recommendations in that the panel suggested that certain formulas be provided and others be assumed known. The rationale for providing all commonly needed formulas is that in a realistic setting references for such formulas would be available. The examinees would be expected to be able to select and apply the appropriate formula.

The test would continue to contain items with both metric and imperial units of measure. The units used would be those which are most relevant and common to the everyday situation presented in the problem; the relative frequency of occurrence of metric and imperial units would be in proportion to their use in realistic settings. (Canadian forms of all subject area tests would use the SI metric units exclusively.) Common conversions within the metric system (e.g., milli, centi, deci, kilo) and the imperial system (e.g., inches/foot or yard, feet/yard, pints/quart, quarts/gallon) would be assumed known. The rationale for assuming these to be known is that they represent knowledge so basic to everyday situations that the necessity of referring to written material would be considered a significant shortcoming. Conversions from one system of measurements to another would be avoided.

Because the items would be presented in realistic settings, they would, at times, include extraneous or insufficient data. Extraneous information would be presented in contexts typical of situations which require sorting-out the information needed from that which is not (e.g., presenting a tax table which includes categories for several marital status categories as a stimulus for an item involving a single person's tax). In order to measure the ability to recognize that insufficient data is given to solve the problem, several items would include as one of the answer alternatives the phrase "insufficient data"; but this alternative would be the correct response for only some of these items.

Problem solving would be addressed at times by presenting a practical problem and then presenting a set of test items. The items in the set would address more than one of the content areas (given above); would require multiple steps to solve; and would sometimes include extraneous and insufficient data. One item would not be dependent on another, however. (That is, an incorrect answer to one or more items in the set would not preclude or dictate a correct response to other items.)

The use of calculators while taking the mathematics test would be permitted, but the items would continue to be developed such that the use of a calculator would not be necessary. That is, arithmetic operations would continue to involve only simple numbers, and no item would depend on computational accuracy at a level that could only be attained by using a calculator. Inexpensive calculators could be made available (along with the other test materials) from the GED Testing Service for use at Official Testing Centers. Examinees, however, would be permitted to use their own calculators. For administrative convenience, calculator use would be permitted on all of the subject area tests even though their usefulness would obviously be limited. Research will be conducted to determine the effect of calculator use on examinee performance.

OVERALL TEST BATTERY DETAILS

Organization of the test battery

From the beginning of the GED program the test battery has contained five tests. One of the major questions addressed by the committee in formulating recommendations for the new test battery was whether the five-test pattern should be retained. While the need for tests relating to the subject areas of English, social studies, science, and mathematics seemed evident, the case for continuing to include a reading test was less clear. (The high school curriculum generally contains English, social studies, science, and mathematics components; reading is not usually so identified.) The committee was mindful of the fact that the ability to read and comprehend written material is necessary for all five of the current tests. It is clearly the case that reading is an enabling skill required for successful GED performance as well as for high school graduation. Statistical studies suggest that the current Reading Skills test adds relatively little information to that already obtained from the scores on the other four tests. Finally, one other argument for deleting this test was that the testing time could be used to accomplish a larger sampling of content from the other four areas.

Dropping test four, however, would have been perceived as suggesting that reading is not an important skill for high school completion. Even though, as the committee noted, a reading score could possibly be derived from segments of the other tests, this strategy would require a degree of centralization of the scoring process. Because the GED Testing Service values the unique local scoring options and rapid score reporting that characterize the program, the required centralization is not suggested; the complexities of developing a workable method for computing a composite reading score locally seem overwhelming. In the end, the sense of the staff was that it would be preferable to retain the reading test, revising it to contain content normally covered in literature and performing arts classes. (Phase 2 survey respondents also strongly favored retaining the five-test battery format.) In this way, the test battery coverage would be somewhat broader, and more in keeping with the high school curriculum, than at present. As can be seen from the description of test four (Literature and the Arts), this test would address the unique content of major concern in a number of high school courses. That is, test four would be revised to represent a test of more substantive content and related skills.

Test administration time

In phase three of the ongoing test review process, survey respondents to date have generally favored a total test administration time of about 6-7 hours, as is presently the case. At least at this preliminary stage in test design, it appears that the new tests could be built so that between six and seven hours would be required to complete the battery.

In order to facilitate test administration, specifically to permit the battery to be administered in two equal-length administrative sessions, tests 1 and 5 would require 90-105 minutes each; tests 2, 3, and 4 are planned to require 60-70 minutes each. Thus, the tests could be administered in two sessions of 180-210 minutes each. Survey respondents, when asked about time limits, did not especially favor uniform time limits for all five tests in the battery; rather, the ability to organize uniform testing sessions seemed paramount.

Because some new item formats are being considered, it will not be possible to finalize the times for administration until after some research studies have established approximate completion rates for each item type. Because test length relates to test reliability, the final number of items (and, therefore, time limits) will be determined so as to yield satisfactory reliability levels. Timing and reliability studies are planned for 1985 to determine test lengths and test time limits. (Survey respondents generally strongly favored the use of time limits--with the teachers evenly split on the issue.)

Speaking and Listening Skills

The specifications committee urged us to consider adding additional tests or test sections incorporating speaking and listening skills. (Respondents to the phase 2 surveys also gave some encouragement along these lines.) In both cases, however, the recommendations were somewhat tentative, and many potential difficulties were noted. The committee and survey respondents both indicated far stronger support for the addition of the writing sample. We have not proposed to include speaking and listening skills in the 1988 tests due to the apparent technical difficulties in developing valid tests (e.g., regional differences in speech patterns) and in administering such tests (e.g., problems in acquiring an adequate sound system and/or enough audiocassette machines, headsets, and so on). For these reasons, it is proposed that the addition of these skills be postponed beyond 1988--pending the completion of feasibility studies.

Spanish and French test editions

Noting the need for these tests in order to offer the GED testing program in Puerto Rico and New Brunswick (respectively), ACE's Commission on Educational Credit and Credentials recently concluded that we should continue to develop and offer these editions (Spille, 1984a). While it is anticipated that new editions of each would eventually be built along the lines of the specifications for the English tests, limited resources may make it impossible to develop new Spanish and French editions for use in 1988. It is important to note, therefore, that although it is hoped that revised Spanish and French tests could be introduced in 1988, their introduction may occur at a later date.

Test score scales

As now planned, the new tests would be scaled on a basis consistent with current and past tests. That is, new standard score scales would be developed on the basis of an administration to a national sample of high school graduating seniors. This norming administration would probably occur in Spring 1986 or 1987. The introduction of the new tests would not, of itself, require any changes in established state and province standards for earning the credential. Because a new scale will be developed, as was done in 1955, 1967, 1977, and 1980, the level of achievement required to earn the credential may shift slightly due to changes in the achievement levels of the nation's high school seniors.

Practice Tests and Publications

We will need to develop at least two forms of the "Official GED Practice Tests" as half-length parallels to the new battery. As with the current Practice Tests, these tests would be similar in all respects to the actual battery, and should carry a score scale fully equated to that for the new batteries. The schedule for developing and scaling these tests is intended to ensure that they are available for use by fall 1987. Too, all program publications (e.g., Patience & Whitney, 1982) will need to be revised and available before the first of the new tests is administered in January 1988.

GED TESTS SPECIFICATIONS COMMITTEE MEMBERS

English Panel

Rexford G. Brown (Chair), Director of Publications, Education Commission of the States (CO)
Charles R. Chew, Chief, Bureau of English Education, New York State Education Department
Donald Edge, Director, Academic Foundations Program, Camden (NJ) County College
Marjorie N. Farmer, Curriculum Consultant (PA); Past President, National Council of Teachers of English
Roger C. Farr, Associate Dean for Research and Graduate Development, Indiana University
Claire L. Pelton, Chair, English Department, Los Altos (CA) High School; Faculty Associate, Stanford University
Harvey S. Wiener, Coordinator, National Testing Network in Writing; Professor of English, City University of New York

Social Studies Panel

Anna Ochoa (Chair), Associate Professor, Social Studies Education, Indiana University
Thomas A. Elliott, Associate Director, Social Studies Service, Division of Humanities and Secondary Administration, Virginia Department of Education
Glenda J. Redden, Social Studies Consultant, Curriculum Development Program, Nova Scotia Department of Education
Helen W. Richardson, Social Studies Coordinator, Fulton County (GA) Board of Education
Kenneth L. Ripp, Social Studies teacher, Eau Claire (WI) Memorial High School
Deborah S. Stedman, Education Specialist, Division of Adult and Community Education, Texas Education Agency

Science Panel

Joseph D. Exline (Chair), Associate Director for Science, Virginia Department of Education
Dale T. Hesser, Director of Science (K-12), North Syracuse (NY) Central Schools
David A. Kennedy, Supervisor of Science and Environmental Education Programs, Washington Superintendent of Public Instruction Office
LeRoy R. Lee, Executive Director, Wisconsin Academcy of Science, Arts, and Letters; Interim Executive Director, National Association of Biology Teachers
Marjorie D. Mayes, Chemistry instructor, Hillsborough (FL) High School; Director of Independent Studies, Blake (FL) Adult and Community School
Robert E. Yager, Professor, Science Education, The University of Iowa

Mathematics Panel

Terry E. Parks (Chair), Director of Mathematics and Computer Based Education, Shawnee Mission (KS) Public Schools
Ernestine Capehart, Mathematics Coordinator, West Virginia Department of Education
Kyo R. Jhin, Assistant Superintendent for Educational Technology, District of Columbia Public Schools
Bill J. A. Kokoskin, Mathematics Department Chairman, Handsworth (BC) Secondary School
Bonnie H. Litwiller, Professor of Mathematics, University of Northern Iowa
Albert P. Shulte, Director, Mathematics Education, Oakland (MI) Schools
David G. Steadman, Supervisor, Accountability and Media, Idaho State Department of Education

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GED TESTS SPECIFICATIONS COMMITTEE

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APPENDIX 1

SAMPLE TEST ONE ITEMS

Directions: The following piece of writing is a first draft which you are asked to revise and correct. The passage contains some errors in sentence structure, usage, and mechanics. After reading the passage, answer the questions which follow. The sentence or sentences which you must revise are repeated before each question, and you are asked to select the most effective way to write the sentence. The revised or corrected sentence must be consistent with the point of view, verb tense, and tone of the rest of the passage. In some cases, the way the sentence was originally written may be the most effective version.

(1)If buying firewood strikes you as a simple task you've probably never done it. (2)What could be easier than purchasing a pile of wood that will eventually go up your chimney in the form of smoke? (3)Almost anything. (4)First of all, different woods have different Btu (British thermal unit) values. (5)The hardwoods, like Oak, are preferable. (6)Because they provide more heat per log than the softwoods. (7)Also, some types of firewood burns cleaner than others. (8)Clean-burning wood is important to avoid building up creosote deposits in your chimney. (9)This means that you must be able to recognize a type of wood when you see it. (10)Or else rely on the word of the person from whom you're buying the wood. (11)Finally there is another problem. (12)That is getting the amount of wood you're paying for. (13)Because wood is usually sold by the cord, it's unlikely that it will be delivered to your door stacked exactly that way.

(14)What is the solution to this dilema? (15)Unless you want to become the neighborhood expert on tree identification, creosote buildup and the latest advances in wood-stacking, the best advice is to find people in your neighborhood who buy wood and ask them whether they're satisfied. (16)After all that, one can sit back in perfect contentment and set fire to your carefully-selected merchandise.

Content: Punctuation
Category: Introductory dependent clause
Item type: Sentence Correction

Sentence 1: If buying firewood strikes you as a simple task you've probably never done it.

1. What correction should be made to this sentence?

(1) change you've to youve
*(2) insert a comma after task
(3) replace you with one
(4) change done to have done
(5) no corrections are necessary

Content: Spelling
Category: Possessives/Contractions
Item Type: Sentence Correction

Sentence 2: What could be easier than purchasing a pile of wood that will eventually go up your chimney in the form of smoke?

2. What correction should be made to this sentence?

(1) replace could with can
(2) change easier than to easier then
(3) change the spelling of eventually to eventualy
(4) insert a comma after easier
*(5) no corrections are necessary

Content: Capitalization
Category: Proper nouns
Item type: Sentence Correction

Sentence 6: The hardwoods, like Oak, are preferable.

3. What correction should be made to this sentence?

(1) change the spelling of preferable to preferible
(2) remove the comma after Oak
*(3) change Oak to oak
(4) change hardwoods to hardwood
(5) change are to is

Content: Sentence structure
Category: Sentence fragment
Item Type: Sentence Revision

Sentences 5 & 6: The hardwoods, like Oak, are preferable. Because they provide more heat per log than the softwoods.

4. Which of the following is the best way to write the underlined portion of these sentences? Option (1) is the same as the original. If you think the original is the best way to write the sentence, choose option (1).

(1) preferable. Because
(2) preferable; because
*(3) preferable because
(4) preferable due to the fact that
(5) preferable for the simple reason that

Content: Usage
Category: Subject-verb agreement
Item Type: Sentence Correction

Sentence 7: Also, some types of firewood burns cleaner than others.

5. What correction should be made to this sentence?

(1) remove the comma after Also
(2) replace some with most
(3) replace types of with kind of
*(4) replace burns with burn
(5) replace cleaner than with more cleaner than

Content: Sentence structure
Category: Sentence fragment
Item Type: Sentence Correction (variation)

Sentences 9 & 10: This means that you must be able to recognize a type of wood when you see it. Or else rely on the word of the person from whom you're buying the wood.

6. The most effective revision of these sentences would be to

(1) replace you in sentence 9 with he
(2) replace it in sentence 9 with that particular type of wood
*(3) combine sentences 9 and 10 to form one sentence
(4) replace whom in sentence 10 with who
(5) replace you're in sentence 10 with your

Content: Sentence Structure
Category: Coordination/subordination
Item type: Construction shift (variation)

Sentences 11 & 12: Finally there is another problem. That is getting the amount of wood you're paying for.

7. The most effective combination of sentences 11 and 12 would include which of the following groups of words?

*(1) the problem of getting
(2) another problem; getting
(3) another problem getting
(4) the problem is getting
(5) another problem which arises as a result of getting

Content: Sentence Structure
Category: Coordination/subordination
Item type: Construction shift

Sentence 13: Because wood is usually sold by the cord, it's unlikely that it will be delivered to your door stacked exactly that way.

8. Rewrite sentence 12 beginning with

Wood is usually sold in cords,

The next word should be

(1) and
*(2) but
(3) so
(4) because
(5) however

Content: Spelling
Category: Spelling
Item type: Sentence Correction

Sentence 14: What is the solution to this dilema?

9. What correction should be made to this sentence?

(1) remove the question mark after dilema
(2) change the spelling of dilema to dillemma
*(3) change the spelling of dilema to dilemma
(4) change the spelling of dilema to dillema
(5) no corrections are necessary

Content: Usage
Category: Pronoun reference
Item type: Sentence correction

Sentence 16: After all that, one can sit back in perfect contentment and set fire to your carefully-selected merchandise.

10. The most important correction to make in revising this sentence would be to

*(1) replace one with you
(2) replace your with one's
(3) remove the comma after that
(4) insert a comma after contentment
(5) replace can with could

SAMPLE ESSAY QUESTIONS

Directions: You will have thirty minutes to plan and write an essay on the topic assigned. An essay on any other topic is not acceptable.

Your essay should be written according to the conventions of standard American English usage and will be evaluated according to how clearly and effectively your ideas are organized and presented. You may not use a dictionary or any other reference material during the test.

TOPICS

Many people in the United States are highly competitive. They are ready to accept any challenge, and they like any sport, game, or business that allows them to try to prove that they can do better than someone else.

Do you view this competitive spirit as good or bad? State your opinion and support it with specific reasons and examples.

Most people in America are very careful to keep their houses and cars neat and clean, yet our city streets, our highways, and our parks are frequently buried in litter.

Explain why people litter. Be sure to support your views with specific reasons, details, and examples.

Recently a city council prohibited some musicians from giving a scheduled concert within the boundaries of the city.

Should local governments be permitted to decide which entertainers may perform in a city? State your view and support it with specific reasons and examples.

Living in a fast-paced society may have many advantages, but one disadvantage is that today's hectic pace makes life more stressful.

Explain how you cope with stress. What do you do to reduce stress or to deal with it when it becomes a problem? Support your explanation with specific details and examples.

APPENDIX 2

SAMPLE ITEMS FOR TEST 2

Question 1 is based on the following information.

Early man sought above all to control the course of nature for practical ends, and he did it directly, by rite and spell, compelling wind and weather, animals and crops to obey his will. Only much later, finding the limitations of his magical might, did he in fear or hope, in supplication or defiance, appeal to higher beings; that is, to demons, ancestor-spirits, or gods.

Content: Behavioral Science
Cognitive Level: Comprehension
Objective: Understands the changing nature of beliefs and the impact on behavior of individuals and groups.

1. According to the information above, which of the following factors best explains the origin of man's religious beliefs?

   (1) fear of death
   (2) love of nature
   *(3) inability to control his environment
   (4) anxiety to appease the gods
   (5) lust for power

Question 2 is based on the following information.

"I bought a TV set from a First Avenue store. It was a used set which was sold as new. After seven days it broke down and the store took it back. They returned it in two weeks and it broke down one week later. They took it away again and I asked for a refund because there was a guarantee of ninety days which had not run out. But they wouldn't give me my $100 or bring me another TV."

Content: Economics
Cognitive Level: Application
Objective: Understands consumer protection in the context of legal rights

2. The situation described above is a principal concern of which of the following agencies?

   (1) Federal Communications Commission
   (2) Welfare Department
   (3) Social Security Office
   *(4) Office of Consumer Protection
   (5) Center for Action Research

Questions 3 - 4 refer to the following information.

In deciding on the form of a new government, the United States Constitutional Convention had to make many compromises. One compromise provided for the two houses of Congress--the Senate, where each state would have two votes, and the House of Representatives, where each state would have one delegate for every 30,000 people. Another compromise was the decision to determine each state's population by adding to the number of free persons, including those bound to service for a term of three years, and excluding Indians not taxed, three-fifths of all other persons.

Content: U.S. History/Political Science
Cognitive Level: Analysis
Objective: Understands interpretations of basic political principals in different periods of U.S. history

3. Which of the following best explains why the method of counting population described above was adopted by the Constitutional Convention?

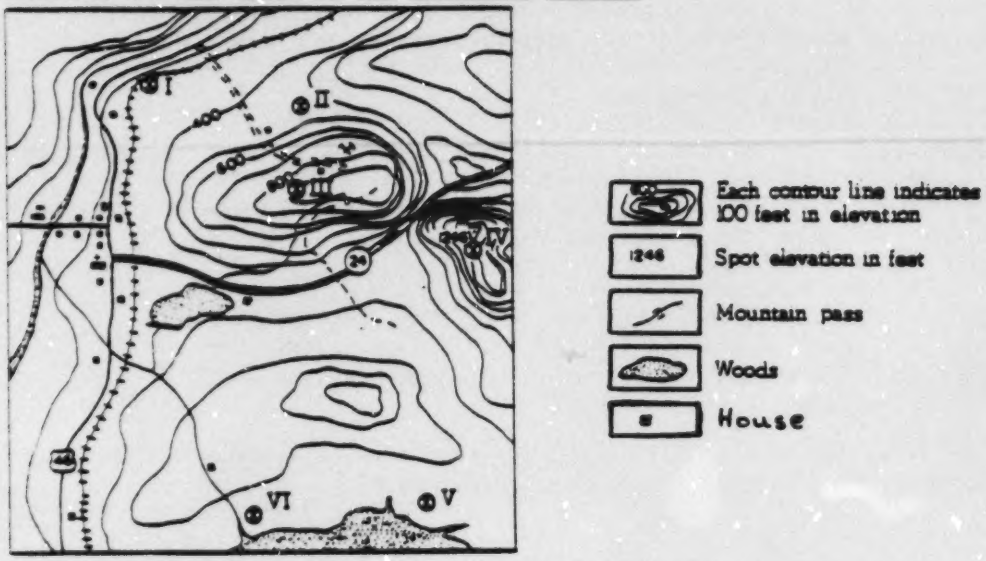
   (1) The tax burden of the states with large slave populations would be reduced.
   (2) Indians and blacks would be denied constitutional grounds for claiming citizenship.
   (3) Indians and blacks would be prevented from ever becoming members of the House of Representatives.
   *(4) The number of congressmen from Southern states where large numbers of slaves increased the population would be controlled.
   (5) Tax-paying Indians would be recognized as free persons.

Content: Political Science
Cognitive Level: Analysis
Objective: Understands the principles underlying the U. S. government

4. Which of the following best explains the purpose for having both a Senate and a House of Representatives in the U. S. Congress?

   (1) Legislation must pass within both the Senate and the House of Representatives in order to become law.
   (2) The Senate allows elected officials to stay in office longer than does the House of Representatives.
   (3) The Senate and the House of Representatives assure that the President will not become too powerful.
   (4) Inaccurate interpretations of the U. S. Constitution are less likely with two branches of Congress.
   *(5) Each state has equal representation in the Senate while more populace states have greater representation in the House of Representatives.

Question 5 - 6 are based on the following figure.



Content: Geography
Cognitive Level: Comprehension
Objective: Interpretation of geological information contained in topographical maps

5. According to the map above, for a walk that requires the least amount of exertion, the best route is from which of the following pairs of points?

(1) I to II
(2) II to III
(3) III to IV
(4) IV to V
*(5) V to VI

Content: Geography
Cognitive Level: Analysis
Objective: Understands the influence of the natural environment on humans

6. From the information in the figure above, which of the following would best explain the locations of the majority of the dwellings shown?

(1) better climate in that area
*(2) topography which makes the area accessible
(3) proximity to timber land
(4) fertility of the soil in that area
(5) the area's low likelihood of flood

Question 7 is based on the following information.

The Monroe Doctrine stated that the United States would no longer allow Europeans to interfere in the internal affairs of the New World.

Content: History / Geography
Cognitive Level: Application
Objective: Understands and applies historical policies of governments

7. According to the Monroe Doctrine, in which one of the following situations would the United States government have responded?

(1) a war between France and England
*(2) Spanish attempts to regain lost Mexican colonies
(3) Dutch acquisition of territory in Indonesia
(4) a breakdown of diplomatic relations between India and Pakistan
(5) a civil war in Panama

Question 8 is based on the following information.

Organized labor, like any other organized group in the United States such as the National Association of Manufacturers, acts as a pressure group. By building up sympathetic public opinion, it tries to influence our lawmakers to vote for legislation favorable to labor.

Content: Political Science
Cognitive Level: Analysis
Objective: Understands influences on governmental decision-making

8. According to the information above, with which of the following statements would a labor union member be expected to agree?

(1) Legislation favorable to labor is bad for industry.
(2) Putting pressure on lawmakers is likely to mean a loss in public sympathy.
(3) Organized labor and the National Association of Manufacturers use entirely different tactics to influence legislation.
*(4) People increase their chances of getting their way by banding together.
(5) The National Association of Manufacturers favors laws that give laborers greater benefits.

Items 9 - 16 refer to the following article.

After a crime, whether it be a robbery, assault, or murder, most people focus their attention on apprehending and prosecuting the criminal. But one important component of the crime often is neglected: the victim.

John Laub, assistant professor of criminal justice at Northeastern University, believes victims are as important as criminals in understanding the dynamics of crime. More importantly, he said analyzing the behavior and demographic characteristics of victims can help criminologists and law enforcement officials learn more about why some groups of people are victimized more than others.

In order to understand victims, their age, race, sex, geographic location, and the kind of crime committed against them must be determined. Laub said one way to compile this data is through the National Crime survey (NCS), conducted by the U.S. Census Bureau in conjunction with the Bureau of Justice Statistics.

What the data reveals is that the typical victim of a street crime usually is male, between the ages of 16 and 25. This also is generally true for the typical criminal in street crimes.

"There is a strong correlation between the offender and the victims," Laub said. "The patterns are distinct when the NCS data are studied."

With the exception of rape, fewer crimes are committed against women and the elderly than against men. Laub said this is a result of the high "fear rate" women and the elderly have.

"Because they are more afraid of crime, women and older people tend to be more cautious," Laub noted. They don't walk along dark streets, or go into neighborhoods which are known to be in high crime areas.

Conversely, men, specifically those in the 12 to 19 age bracket, have low fear of crime. They usually do not change their behavior when they are in a high crime-risk situation, and therefore have a higher rate of victimization.

(from Maureen Staley, "Fear Lowers The Odds." Northeastern Alumni Magazine, Vol. 8, No. 5, May/June, 1983.)

Content: Behavioral Science
Cognitive Level: Analysis / evaluation
Objective: Can distinguishes critical aspects of problem or situation

Below are eight statements regarding the research study described above. Classify each statement as one of the following (Problem, Finding, Theory, Important Factor, or Irrelevant Factor) according to how the statement relates to the research study described.

(1) PROBLEM: The major problem, situation, or question being studied
(2) FINDING: Fact verified by the study which directly addresses the problem
(3) THEORY: A theory, belief, or assumption given as an explanation of a finding
(4) IMPORTANT FACTOR: Background information which relates directly to either a finding or a theory
(5) IRRELEVANT FACTOR: Background information which has no direct impact on either a finding or a theory

9. Men between the ages of 16 and 25 are most likely to be victims of robbery, assault, or larceny. (2)

10. Characteristics of crime victims are rarely studied. (1)

11. Women and the elderly are more cautious because they are more afraid. (3)

12. The data were compiled by the U. S. Census Bureau. (5)

13. The more afraid a person is, the less likely he or she is to be a victim of crime. (3)

14. The characteristics of the typical criminal are similar to those of the typical crime victim. (5)

15. The data represent a broad cross-section of both criminals and victims. (4)

Content: Behavioral Science
Cognitive Level: Evaluation
Objective: Critically evaluates written information and draws warranted conclusions

16. Which of the following statements is an assumption not directly supported by the data presented?

(1) Men between the ages of 16 and 25 are more likely to be the victims of crime.
(2) Criminals are generally males between the ages of 16 and 25.
(3) Older people are more susceptible to crime.
(4) Women are typically the victims of criminals
*(5) Men are victimized because they have less fear than women.

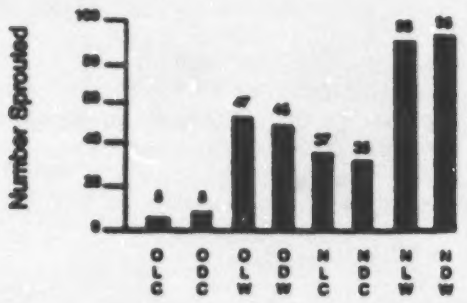
APPENDIX 3

SAMPLE SCIENCE TEST ITEMS

Content: Life Sciences (Biology)/ Understanding the potential of science
Cognitive Level: comprehension

This is a graph of the results of an experiment. 400 seeds that were 10 years old and 400 new seeds were planted in good soil and watered each day.

100 old seeds and 100 new seeds were put in a dark, cool place.
100 old seeds and 100 new seeds were put in a light, cool place.
100 old seeds and 100 new seeds were put in a dark, warm place.
100 old seeds and 100 new seeds were put in a light, warm place.



O = Old N = New
L = Light D = Dark
C = Cold W = Warm

1. Five things which may affect the growth of seeds are: water, heat, soil, age and light. Which of these factors were tested in this experiment?

*(1) heat, age, and light
(2) soil, heat, and light
(3) heat, soil, age, and light
(4) water and light
(5) water and age

Content: Physical Sciences (Physics)/ Relationship of science to personal life
Cognitive Level: Analysis

One hot July morning the center span of a low steel bridge across a river was swung open to allow a long string of barges to pass through. While the bridge was open the temperature rose many degrees. When the bridge tender tried to close the bridge again, the center span would not fit. It was too long.

Problem: What could be done to get the bridge closed?

Below are a number of suggestions for closing the bridge.

A. Squirt hot water on the bridge span for about 20 minutes

B. Squirt cold water on the bridge span for about 20 minutes

C. Place dry ice along the bridge span for about 20 minutes

2. If carried out, which of the above suggestions would result in getting the bridge closed?

(1) B only
(2) C only
(3) either a or b
*(4) either B or C
(5) either A, B or C

Content: Life Sciences (Biology)/ Understanding the potential of science
Cognitive Level: Analysis and Evaluation

One way to find out how a gland works is to see what happens when it is removed from a living animal. Four-week-old rats whose pituitaries were removed remained the same size, not gaining an ounce of weight even on the best known rat diet. This work showed that, deprived of their pituitary glands, the animals did not grow. However, it did not prove that the gland helped growth.

The next step was to feed rats pituitary tissue to determine if this would stimulate growth. The gland tissue, obtained from animals in slaughterhouses, did not make the rats grow. In the normal animal, the gland's secretion does not get to the tissues by way of the mouth and the digestive tract but is released directly into the blood. So a different way of administering pituitary extract had to be found.

Two physiologists, Phillip E. Smith and E. T. Engle of Columbia University, came up with the solution in 1927. They took glands from two of the five rats born of the same mother in the same litter. They already knew from previous experiments that the rats would not grow, and the ruler showed plainly that these rats were not measuring up to their litter mates. They now injected into the blood system of one of the two rats an extract they had removed from the pituitaries of other animals; the other rat received none. Soon they were ready to measure their results. The rat that had received no pituitary extract remained dwarfed, whereas its litter mate grew to three times the other's size.

Below are 10 statements regarding the experiment described above. Classify each statement into one of these groups according to how the statement relates to this experiment.

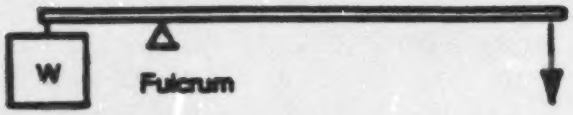
(1) THEORY: an assumption or belief that may or may not be true
(2) TREATMENT: the procedures used to test the accuracy of a theory
(3) FINDING: the results of a specific treatment
(4) IMPORTANT FACTOR: background information that has a significant effect on the findings of the experiment
(5) IRRELEVANT FACTOR: background information that has no effect on the findings of the experiment

3. When the pituitary extract reached the tissue through the blood, it stimulated growth.
4. Scientists fed pituitary tissue to rats.
5. Rats who fed on the pituitary tissue did not grow.
6. The rat that received no pituitary extract remained dwarfed.
7. The pituitary gland helps growth.
8. In the normal animal, pituitary gland secretions are released directly into the blood.
9. There were five rats in the litter.
10. Scientists injected pituitary extract into the blood system of one rat.
11. Feeding rats pituitary tissue stimulates growth.
12. The experimental rats were born of the same mother in the same litter.

KEY: 3,2,3,3,1,4,5,2,1,4

Content: Physical Sciences (Physics)/ Relationship of science to personal life
Cognitive Level: Application

13. What is the advantage of using a lever such as that shown in the diagram to raise a weight W instead of lifting it directly?



(1) Less energy is required.
(2) It is quicker.
*(3) Less force is needed.
(4) Less movement is needed.
(5) Less work has to be done.

Content: Physical Sciences (Earth science)/ Understanding the natural environment
Cognitive Level: Analysis

14. A fossil of an ocean fish was found in a rock outcrop on a mountain. Which of the following is the most likely explanation for this?

(1) Fish once lived on the mountain.
(2) The relative humidity was once very high.
*(3) The mountain was raised up after the fish died.
(4) Fish used to be amphibians like toads and frogs.
(5) The fossil fish was probably carried to the mountain by a great flood.

APPENDIX 4

SAMPLE ITEMS FOR TEST 4

PASSAGE 1

Content: Literary Selections/Popular

HOW DID THIS INVENTION CHANGE THE OLD WEST?

That a handcrank coffee mill helped kill off the Old West has not been widely appreciated. For five thousand miles I'd driven between fences, but along New Mexico 81, for the first time, there was none. At last I'd come to open range, a thing disappearing faster than the condor.

In 1874, an Illinoisan, Joseph Glidden, received the first patent for a barbed fencing wire he made on a converted coffee mill. Ranchers called the stuff "the Devil's hatband," but they saw their economic future in it: the new fence gave means to control breeding and thereby upgrade stock, and it allowed a single well to water an entire herd. Before barbed wire, the West had few long fences because there wasn't wood enough to build them, and cattle trampled wooden fences anyway. No alternative to open range and cowhands existed. But a barbed wire fence was cheap to buy, erect, and maintain over the big acreages required in the West, and cattle shied from it once they ran against it. In the 1870's some animals cut themselves to death on it, and one rancher said that at first he could hardly drive a cow between two posts.

But Glidden's invention offered something even more important: a means of staking property claims, particularly on plats belonging nominally to the federal government. Ranchers fenced claims to establish ownership, and entire towns ended up encircled or cut off from access to public land. Neighbors tore out each other's fences, and President Cleveland ordered the Army to take down illegal ones. It was too late. What began as "range privilege" became an unlawful seizure that was the basis for many of the great cattle empires.

And so, from the prototype of the coffee mill, came the successors that partitioned the West and changed it forever: Glidden's Twisted Oval, Briggs' Obvious, Allis' Sawtooth, Scutt's Arrow Plate, Brinkerhoff's Riveted Splicer. Staples and pliers became more important than bullets and pistols, and the cowboy went from riding the range to riding fence and greasing the bearings on a windmill. No longer was there need to drive range cattle to pasturage and water or to sort out herds; the cowboy was on his way to becoming a feedlot attendant, and a piece of American history turned to legend. With the transport of cattle to market by truck, the shift was complete.

(from William Least Heat Moon. Blue Highways. New York: Fawcett Crest, 1982.)

Cognitive Level: Literal Comprehension/Specific
Objective: To comprehend the meaning of a specific term

1. "Gliddan's Twisted Oval," "Briggs' Obvious," and "Allis' Sawtooth" (lines 28-30) are names of

   (1) types of coffee mills
   (2) ranches
   (3) towns
   *(4) types of barbed wire
   (5) famous cattle

Cognitive Level: Literal Comprehension/Specific
Objective: To comprehend the purpose of a supporting statement

2. According to the passage, many of the great cattle empires included land that belonged to

   (1) the towns
   (2) their neighbors
   *(3) the federal government
   (4) the Indians
   (5) the Army

Cognitive Level: Literal Comprehension/Global
Objective: To comprehend the main idea of a passage

3. According to the passage, what is a major reason for the changes that occurred to the lifestyle of cowboys in the Old West?

   (1) Public land was made available for grazing.
   (2) Public land was fenced off so that it could no longer be used for grazing.
   *(3) Ranchers were able to control the movements of cattle by fencing in the range.
   (4) Cattle could not be driven across the range because fences were in the way.
   (5) Cowboys could no longer be paid because of the expense of fencing in the range.

Cognitive Level: Inferential Comprehension/Specific
Objective: To interpret illustrative detail

4. "...one rancher said that at first he could hardly drive a cow between two posts."

   The author includes this rancher's remark to show

   (1) that the fence posts were as effective as the barbed wire fences
   *(2) how effectively the barbed wire fences restrained the cattle
   (3) how difficult the cattle were to train
   (4) how accustomed the cattle had become to the open range
   (5) the difficulties cowboys had in working with the new barbed wire fences

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Cognitive Level: Inferential Comprehension/Global
Objective: To interpret the meaning of supporting concepts

5. The "range privilege" the author refers to in the passage (line 25) refers to the

   (1) opportunity to erect fences anywhere on the range
   (2) opportunity to seize land by claiming ownership
   (3) right to deny free access to public land
   (4) right to raise as many cattle as the range could support
   *(5) right to use public land as grazing land for cattle

Cognitive Level: Evaluation
Objective: To comprehend stylistic techniques

6. The author's introductory sentence is effective in capturing the reader's interest because it

   *(1) offers an unusual explanation for the changes to the Old West.
   (2) explains some new effects of the changes to the Old West.
   (3) relies on the author's personal experience in the West.
   (4) refers to ideas about the Old West which are familiar to most readers.
   (5) provides ample support for the position that is taken.

PASSAGE 2

Content: Literary Selections/Classical

WHAT IS PRINCE ANDREW'S VIEW OF SOCIAL CLASSES?

"Come, let's argue then," said Prince Andrew. "You talk of schools," he went on, crooking a finger, "education and so forth; that is, you want to raise him" (pointing to a peasant who passed by them taking off his cap) "from his animal condition and awaken in him spiritual needs, while it seems to me that animal happiness is the only happiness possible, and that is just what you want to deprive him of. I envy him, but you want to make him what I am, without giving him my means. Then you say 'lighten his toil.' But as I see it, physical labor is as essential to him, as much a condition of his existence, as mental activity is to you or me. You can't help thinking. I go to bed after two in the morning, thoughts come and I can't sleep but toss about till dawn, because I think and can't help thinking, just as he can't help plowing and mowing; if he didn't, he would go to the drink shop or fall ill. Just as I could not stand his terrible physical labor but should die of it in a week, so he could not stand my physical idleness, but would grow fat and die. The third thing--what else was it you talked about?" and Prince Andrew crooked a third finger. "Ah, yes, hospitals, medicine. He has a fit, he is dying, and you come and bleed him and patch him up. He will drag about as a cripple, a burden to everybody, for another ten years. It would be far easier and simpler for him to die. Others are being born and there are plenty of them as it is. It would be different if you grudged losing a laborer--that's how I regard him--but you want to cure him from love of him. And he does not want that. And besides, what a notion that medicine ever cured anyone! Killed them, yes!" said he, frowning angrily and turning away from Pierre.

(from Leo Tolstoy. War and Peace. Trans. Louise and Aylmer Maude. Ed. George Gibian. New York: Norton, 1966.)

Cognitive Level: Literal Comprehension/Specific
Objective: To comprehend the meaning of a term

7. What is Prince Andrew referring to when he speaks of his "means" (line 8)?

(1) his personality
*(2) his wealth
(3) his intentions
(4) his intelligence
(5) his philosophy

Cognitive Level: Literal Comprehension/Global
Objective: To comprehend relationships among elements

8. Prince Andrew states his view of society by comparing himself to

(1) Pierre
(2) an invalid
(3) a doctor
*(4) a peasant
(5) an animal

Cognitive Level: Literal Comprehension/Global
Objective: To comprehend the main idea of a passage

9. Prince Andrew envies people who

*(1) are not troubled by thinking too much about life
(2) do not have to perform physical labor
(3) are born into a life of wealth and leisure
(4) are able to cure sick people
(5) have deeply spiritual needs

Cognitive Level: Inferential Comprehension/Global
Objective: To generalize from supporting evidence

10. The basis of Prince Andrew's argument is his belief that the existing social order

(1) is seriously flawed
*(2) should remain unchanged
(3) places too much emphasis upon the value of labor
(4) places too much emphasis upon the value of medicine
(5) makes everyone unhappy

Cognitive Level: Inferential Comprehension/Global
Objective: To predict from supporting information

11. Prince Andrew thinks that a peasant would be <u>least</u> <u>likely</u> to

(1) enjoy physical labor
(2) be polite to his superiors
*(3) enjoy a philosophical discussion
(4) sleep soundly at night
(5) go drinking with his friends

Cognitive Level: Evaluation
Objective: To evaluate elements of characterization

12. In this passage, the author portrays Prince Andrew as a man who

(1) is uncertain what he really believes about society
(2) has definite opinions but is unable to present them clearly
(3) lacks conviction regarding his opinions
(4) is anxious to agree with Pierre's opinions
*(5) has definite opinions and presents them forcefully

PASSAGE 3

Content: Commentary/ Television

HOW HAVE MACHINES AFFECTED TELEVISION SHOWS?

They never complain. They never forget their lines. They have no agents or egos. They are composed of moving parts, but their parts are rarely moving. They are sex objects who do not object to being handled, symbols of power whose judgments go unquestioned, the most impersonal of actors in the most personal of media. They are the new stars of prime-time network television: machines.

Helicopters, cars and computers dominate such action-adventure shows as Magnum, P.I., Matt Houston, Trauma Center, Scarecrow and Mrs. King, Cutter to Houston and The Fall Guy. Coptermania is the current craze. The air waves are bristling with blades, and gyrating, swooping chase sequences have become as common as the earthbound four-wheeled variety. ABC's new series Blue Thunder (derived from the movie of the same title) features a mean, blackbottle fly of a police chopper that is essentially an aerial machine gun equipped with supersnooping devices. CBS's Airwolf is about a supersonic CIA attack helicopter that is invisible to radar. One of its pilots, Ernest Borgnine, decorously refers to it as "she," as if it were a more temperamental version of the flying nun.

Traditionally, television heroes not only have right on their side, but they also brandish the fanciest gadgets. Bad guys drive the crummy cars. Faith in technology was the implicit theme of such shows as Mission: Impossible and The Man from U.N.C.L.E. On sophisticated medical series, from Trapper John, M.D. to St. Elsewhere, the wise doctors bolster their charming bedside manners with CAT scans. One exception to this pattern is NBC's current gaudy hit The A-Team, which crudely parodies the medium's infatuation with machinery. The team typically has to borrow (and often demolish) the newfangled hardware of its enemies because its own makeshift equipment is rusty and outmoded.

The team mascot, Mr. T, with his clanking jewelry, rocket-shaped hairdo and stiff acting, is actually the most fearsome machine on that show. On virtually all the rest of these series, the machines appear more animate than the actors. it is the human characters who seem mass-produced, interchangeable and equipped with only artificial intelligence. But therein may be the consolation. The more mechanically inhuman the shows become, the more they may take on another machine-like trait that in their case would be a blessing: built-in obsolescence.

(from Richard Stengel, "Cars, Computers and Coptermania." Time, Vol 123, No.4, January 23, 1984.)

Cognitive: Literal/Specific
Objective: To comprehend the meaning of specific terms

13. As used in the article, the term "Coptermania" (line 9) means

(1) fear of helicopters
*(2) excessive attention to helicopters
(3) inability to control helicopters
(4) hatred of helicopters
(5) the misuses of helicopters

Cognitive: Literal/Specific
Objective: To comprehend supporting statements

14. Which of the following statements best describes the author's opinion of the human characters in television action shows?

(1) They are more interesting than the machines they use.
(2) Each character has individual characteristics that are distinguishing.
(3) They are more intelligent than the machines they use.
(4) They are among the best of the actors on television.
*(5) Their lack of originality and intelligence makes them similar to the machines they use.

Cognitive: Literal/Global
Objective: To comprehend the meaning of illustrations

15. The author uses The A-Team as an example of an action show which

(1) uses machines in a way typical of all other action shows
(2) uses no machines at all
(3) relies on actors' human characteristics rather than on machines
*(4) makes fun of the use of machines on other television shows
(5) uses only the most technologicaly-advanced machines.

Cognitive: Inferential/Specific
Objective: To comprehend the meaning of figurative language

16. Why does the author uses the phrase "rocket-shaped hairdo" (lines 30-31)?

*(1) to show the machine-like qualities of Mr. T
(2) to compare Mr. T to a helicopter
(3) to illustrate how television shows set fashion trends
(4) to show why Mr. T is an ineffective actor
(5) to contrast Mr. T's human qualities with those of machines

Cognitive: Inferential/Global
Objective: To comprehend the meaning of a conclusion

17. What attitude towards television action shows does the author reveal in the last sentence of the article (lines 35-38)?

(1) He would prefer shows that use fewer machines.
(2) He would like to see the shows last longer.
*(3) He would like to see the shows go off the air quickly.
(4) He would like to see the shows use more modern machines.
(5) He would like to see the actors take on more machine-like characteristics.

Cognitive: Evaluation
Objective: To evaluate an author's tone

18. Which of the following best describes the author's approach towards his topic in this article?

*(1) informal and humorous
(2) formal and serious
(3) highly enthusiastic
(4) bitter and resentful
(5) precise and analytical

APPENDIX 5

LIST OF FORMULAS

The following is a list of formulas which would be provided; others may be added if needed to cover the kinds of items written for the test. Not all of the formulas would necessarily be used on a given test; the examinee would be required to select the appropriate formula and be able to use it in solving a particular problem. Test items would, at times, require the application of more than one formula. It should be noted that these formulas are the common means for solving certain types of problems; many of the test items obviously require that the examinee determine, set-up, and solve equations unique to the problem (e.g., the methods for balancing a check book). This type of formula or methodology is not given.

Description	Formula
area of a square	$a = b^2$; where a=area, b=base
area of a rectangle	$a = bh$; where a=area, b=base, h=height
area of a triangle	$a = (bh)/2$; where a=area, b=base, h=height
area of a circle	$a = \pi r^2$; a=area, π=3.14, r=radius
perimeter of a square	$p = 4b$; where p=perimeter, b=base
perimeter of a rectangle	$p = 2b + 2h$; where p=perimeter, b=base, h=height
perimeter of a triangle	$p = a + b + c$; where p=perimeter, a=base, b=height, c=hypotenuse
circumference of a circle	$c = 2\pi r$; where c=circumference, π=3.14, r=radius
volume of a cube	$v = b^3$; where v=volume, b=base
volume of a rectangular container	$v = bhl$; where v=volume, b=base, h=height, l=length
volume of a triangular container	$v = (bhl)/2$; where v=volume, b=base, h=height, l=length
volume of a cylinder	$v = 2\pi r^2 h$; where v=volume, 11=3.14, r=radius, h=height

LIST OF FORMULAS (continued)

Description	Formula
Pythagorean relationship	$a^2 + b^2 = c^2$; where a=base, b=height, c=hypotenuse
distance between two points in a plane	$d = \sqrt{a^2 + b^2}$; where d=distance, a=number of units difference in x-coordinates of two points, and b=number of units difference in y-coordinates of two points
slope of a line	s = a/b; where s=slope, a=units rise (difference in x-coordinates of two points on the line), and b=units run (difference in y-coordinates of the two points on the line)
mean	mean = (sum of x)/n; where x's are the values in the series for which a mean is desired, n=the number of of values in the series
median	median = the point in an ordered set of numbers at which half of the numbers are above and half of the numbers are below this value
simple interest	i=prt; where i=interest, p=principal, r=rate, t=time
distance as function of rate & time	d=rt; where d=distance, r=rate, t=time
total cost	c = nr; where c=cost, n=number of units, r=cost per unit

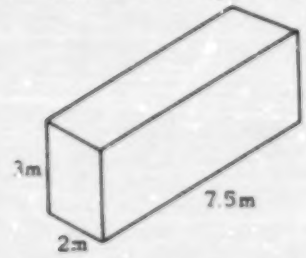
SAMPLE ITEMS FOR TEST 5

Content: Measurement/ money, Algebra/ distributive and associative laws
Objective: Translation of verbal expression to numerical expression

1. Ellen worked 2 hours on Friday and 6 hours on Monday and was paid $4 per hour. Which of the following expressions gives the number of dollars that she earned in the two days?

   (1) (4 x 2) + (6 x 2)
   (2) (4 x 2) + 6
   *(3) 4(2 + 6)
   (4) 6(4 + 2)
   (5) 2(6 + 4)

Content: Measurement/ volume
Objective: Calculation of volume of a rectangular container



2. A crate is constructed as shown above with the dimensions 3 metres by 2 metres by 7.5 metres. What is the volume of the crate in cubic metres?

   (1) 6
   (2) 37
   (3) 38
   *(4) 45
   (5) 63

Content: Measurement/ length
Objective: Translate, set-up, and solve measurement problems involving intra-system unit conversion

3. A bookcase is to be built with six shelves. Each shelf is to be 3 feet 3 3/4 inches long. The boards to be used for the shelves are 10 feet long. Assuming little or no waste, how many of the boards are needed to construct the shelves?

   (1) 1
   *(2) 2
   (3) 3
   (4) 4
   (5) 5

Content: Algebra/ solution of one variable linear equations
Objective: Translate, set-up, and solve for one unknown

4. The batting average of a baseball player is the ratio of the number of hits to the number of times at bat. At the all star break in the season, Dick Allen's batting average was 0.311. If at that point in the season Allen had been at bat 90 times, how many hits had he made?

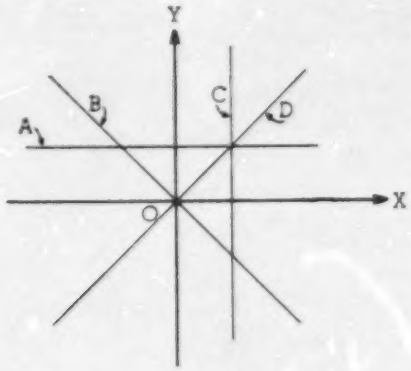
(1) 27
*(2) 28
(3) 29
(4) 31
(5) 32

Content: Algebra/ solution of two variable linear equations
Objective: Translate, set-up, and solve two variable equations

5. In one week at Memorial Hospital twice as many girl babies were born as boy babies. If sixty babies were born in all, how many were boys and how many were girls?

(1) 10 boys and 50 girls
(2) 15 boys and 30 girls
*(3) 20 boys and 40 girls
(4) 40 boys and 20 girls
(5) 50 boys and 10 girls

Question 6 is based on the following graph.

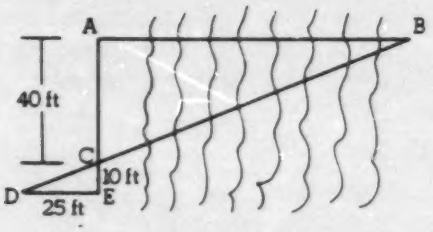


Content: Geometry/ slope
Objective: Identify the slope of a line

6. Which of the lines shown in the figure above has a slope of zero?

*(1) A
(2) B
(3) C
(4) D
(5) none of the above

Question 7 is based on the following diagram.



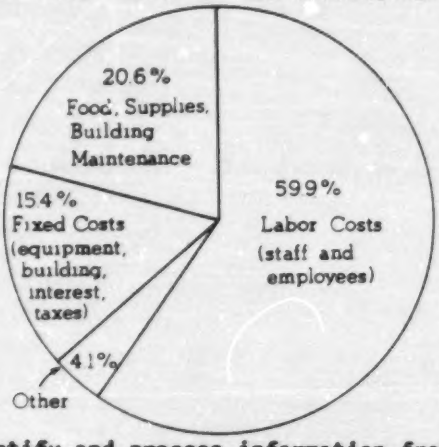
Content: Geometry/ Relationships of similar geometric shapes
Objective: Use geometric properties to find measurements

7. A surveyor made the measurements shown above. What is the distance AB across the stream?

(1) 50 feet
(2) 75 feet
(3) 80 feet
*(4) 100 feet
(5) 150 feet

Questions 8 - 10 refer to the following graph:

AVERAGE DAILY COSTS OF ALL NURSING HOMES



Content: Statistics/ Identify and process information from circular graph
Objective: Select, organize, and add appropriate per cents

8. If equipment, building, interest, and taxes are the only fixed costs, what per cent of the total cost is not fixed?

*(1) 84.6%
(2) 80.5%
(3) 79.4%
(4) 64.0%
(5) 15.4%

Content: Statistics/ Identify information from circular graph
Objective: Selection of appropriate data, and estimation

9. The average daily labor costs of nursing homes account for approximately how many times as much as the cost of food, supplies, and building maintenance?

(1) one-third
(2) one-half
*(3) three
(4) four
(5) forty

Content: Statistics/ Mean, Measurement/ Money; (multi-content), (multi-step)
Objective: Multiplication and division of decimals to estimate an average

10. If the total budget for the nursing homes is 2 million dollars per year, and there are 100 staff members and employees, what is the average yearly income of each staff member or employee?

(1) $ 10,000
*(2) $ 12,000
(3) $100,000
(4) $120,000
(5) insufficient data

Content: Measurement/ Time Interval, Numeration/ Number Patterns; (multi-content), (multi-step)
Objective: Recognize number pattern, use to determine rate and time interval

11. Dave has a pool in his yard which holds 1500 gallons of water. He started filling it at 10:00 Saturday morning. By 12:00, there were 320 gallons of water in the pool, and by 3:00 there were 800 gallons. At this rate, at about what time will the pool be filled?

(1) 4:45 PM
*(2) 7:30 PM
(3) 8:00 PM
(4) 8:30 PM
(5) 9:30 PM

Questions 12 - 15 refer to the following situation

After several interviews, Pat was offered two jobs and had to decide which to take. The starting salary for Job A is $15,500 per year, with a 4% raise to be given after 6 months, and a 6% raise to be given after one year. She will have to drive 10 miles each way to this job, which will use about 20 gallons of gas per month in her car, and will have to pay $50 per month for parking.
The monthly salary for Job B is $1350 with a 10% raise to be given after one year. There are no parking facilities at Job B, so Pat will have to use public transportation. Each way, the bus fare is $.50, and the subway fare is $1.50.
Pat's decision on which job to take is based only on which job will net her more money, since both jobs appear equally interesting to her.

Content: Measurement/ Time Interval, Money (multi-step)
Objective: Select appropriate data, translate written description to mathematical expression using decimals (money, per cents) and rounding

12. At Job A, what will Pat's salary be after one year, to the nearest dollar?

(1) $15,120
(2) $16,430
(3) $17,050
*(4) $17,087
(5) insufficient data

Content: Measurement/ Time Interval, Money
Objective: Determine insufficient data

13. Including gas and parking, how much will it cost Pat for transportation each month if she takes Job A?

(1) $71.80
(2) $72.40
(3) $74.60
(4) $77.00
*(5) insufficient data

Content: Measurement/ Time Interval, Money (multi-step)
Objective: Select appropriate data, translate it to mathematical expression converting time intervals (month to year); calculate and add per cents

14. At Job B, what will Pat's annual salary be after one year?

(1) $ 1,485
(2) $16,200
(3) $17,050
*(4) $17,820
(5) insufficient data

Content: Measurement/ Time Interval, Money (multi-step)
Objective: Select and translate appropriate written description to mathematical expression, using estimation

15. Including bus and subway fare, approximately how much will it cost Pat for transportation each month?

*(1) $80.00
(2) $70.00
(3) $40.00
(4) $20.00
(5) insufficient data

Questions 16 - 18 are based on the following situation

Sandy bought two cans of beige paint, three cans of light blue paint, and five cans of light yellow paint for the purpose of painting her apartment. The colors were specially mixed by the store, but when Sandy got home with the paint, she realized that the store had forgotten to write the colors on the paint can labels.

Content: Probability/ Probability of a single event
Objective: Translate verbal expression to mathematical expression; determine probability of a single event

16. Sandy wants to begin painting with the light yellow color, but she has no way of knowing which cans of paint are yellow. She decides to just open a can at random. What are the chances that the first can of paint that she opens will be of yellow paint?

    (1) 10%
    (2) 20%
    (3) 25%
    *(4) 50%
    (5) 75%

Content: Probability/ Probability of a single event
Objective: Translate verbal expression to mathematical expression; determine probability of a single event

17. The first can of paint that Sandy opens turns out to be of beige paint. Given this additional information, which of the following expressions represents the chances that the second can that she opens will also be of beige paint?

    (1) 2 out of 5
    *(2) 1 out of 9
    (3) 3 out of 10
    (4) 2 out of 10
    (5) 1 out of 2

Content: Probability/ Probability of a single event
Objective: Translate verbal expression to mathematical expression; determine probability of a single event

18. The second can of paint that Sandy opens turns out to be of the light blue paint. Given that the first can of paint she opened was the beige paint and this second can is of light blue, what is the probability that the third can of paint that she opens will be the yellow color that she wants to start painting with?

    (1) 1/5
    (2) 3/8
    (3) 5/10
    *(4) 5/8
    (5) 2/3

Content: Numeration/ Order of Operations
Objective: Use computer awareness (order steps of a sequence to produce desired output) to apply the order of operations

19. A computer programmer is asked to produce a program that will calculate a persons gross pay given that anything over 40 hours is at a rate of 1 and a half times the regular hourly rate. The programmer assigns the following variable names for the program.

TH = total hours
OH = overtime hours
RW = regular hourly wage
RP = regular pay
OP = overtime pay
GP = gross pay

Of course, only the values of the variables TH and RW will be known when the program is to be run. The steps the programmer writes down are given below.

(A) OH = TH - 40
(B) RP = TH x RW
(C) If TH is greater than 40 then TH = 40
(D) If OH is less than 0 then OH = 0
(E) GP = RP + (OH (RW x 1.5))

Which sequence of steps will correctly calculate gross pay?

(1) A, B, C, D, E
*(2) A, D, C, B, E
(3) C, A, D, B, E
(4) B, C, A, E, D
(5) D, A, E, B, C

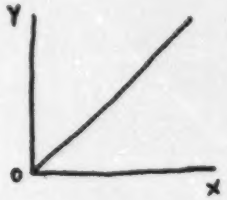
Items 20 - 22 refer to the following pair of hypothetical temperature scales, Y and X. Three pairs of corresponding values on the two scales are indicated below on number lines.

```
        0        40                                160
Y---+--------+-------------------------------+----
  -20         0                                60
X---+--------+-------------------------------+----
```

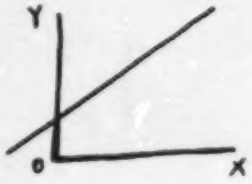
Content: Measurement/ Scales, Algebra/ Linear equations; (multi-content)
Objective: Translate mathematical symbols into words and vice versa; solve for linear equations with one variable

20. Which of the following graphs represents the relationship between the scales Y and X?

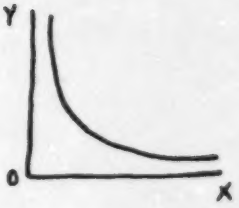
(1)



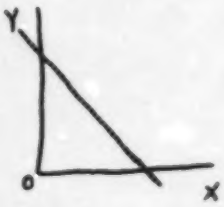
*(2)



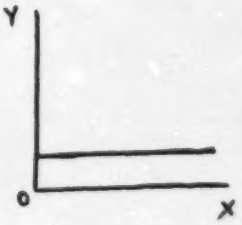
(3)



(4)



(5)



Content: Algebra/ Linear equations
Objective: Determine equation relating two given linearly related scales.

21. Which of the following equations exactly expresses the relationship between Y and X?

(1) $Y/X = 2$
(2) $Y = -2X + 40$
(3) $Y = 2X$
*(4) $Y = 2X + 40$
(5) $YX = 2$

Content: Algebra/ Linear equations
Objective: Desribe numerical relationships in appropriate verbal terminology.

22. Which of the following correctly describes the relationship between the scales Y and X?

*(1) directly related only
(2) directly proportional and also directly related
(3) inversely related only
(4) inversely proportional and inversely related
(5) none of the above